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EXAMINER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	**Application No.** 10/696,236	**Applicant(s)** CREDELLE, THOMAS LLOYD	
	Examiner SEOKYUN MOON	**Art Unit** 2629	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _22 February 2011_.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-5,8-21,25,26 and 28-35_ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) _1-5,8-21,25,26 and 28-35_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _16 March 2007_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _06/23/2011_.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Status of Claims in the Last Office Action

Claims 32-34 were rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement.

Claims 1-4, 8-11, 13-21, 25-26, and 28-31 were rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 6,326,981 by Mori et al. (herein after "Mori") in view of U.S. Patent No. 6,714,206 by Martin et al. (herein after "Martin").

Claims 5 and 12 were rejected under 35 U.S.C. 103(a) as being unpatentable over Mori and Martin, and further in view of U.S. Patent No. 5,841,411 by Francis.

Claims 32-35 were rejected under 35 U.S.C. 103(a) as being unpatentable over Mori in view of Martin and U.S. Patent No. 7,259,755 by Ahn.

Response to Arguments

The Applicant's arguments filed February 22, 2011 have been fully considered.

Based on the Applicant's arguments disclosed on page 12 of the Applicant's Remarks, the Applicant appear to argue that the two adjacent subpixels "RB" or "GB" cannot be reasonably construed as the claimed "*smallest chooseable repeating group*" because claims 32-34 disclose that a display panel is substantially tessellated by the claimed "*smallest chooseable repeating group*" and the two adjacent subpixels "RB" or "GB" do not tessellate the display panel.

Examiner respectfully disagrees.

According to online Merriam Webster dictionary, the word, "*tessellate*" is defined as *to form into or adorn with mosaic*. "tessellate." Merriam-Webster.com. Merriam-Webster, 2011 Web. 29 July 2011. and the word, "*mosaic*" is defined as *a surface decoration made by inlaying small pieces of variously colored material to form pictures or patterns*. "mosaic." Merriam-Webster.com. Merriam-Webster, 2011 Web. 29 July 2011. Since, as shown below (which is reproduced based on figure 6 and the Applicant's explanation provided on page 12 of the Applicant's Remarks), a plurality of two adjacent subpixels "RB" are small pieces of colored material, which form patterns on the surface of the panel, the plurality of two adjacent subpixels "RB" forms a mosaic pattern on the panel, and thus the panel is tessellated by the plurality of two adjacent subpixels "RB". Accordingly, Examiner respectfully submits that the two adjacent subpixels, "RB" or "GB" is the primitive subpixel repeating group which is the smallest chooseable repeating group among possible repeating groups, and thus the claim limitation, "*said primitive repeating group including in each row thereof, a first colored subpixel, a second colored subpixel and a third colored subpixel, which have different colors from each other*" is not supported by the specification of the instant Application.

R B	G B	R B	G B
G B	R B	G B	R B
R B	G B	R B	G B
G B	R B	G B	R B
R B	G B	R B	G B
G B	R B	G B	R B
R B	G B	R B	G B
G B	R B	G B	R B

Contrary to the Applicant's assertion, "... *the Examiner appears to be insisting that he will be the one who defines what a "repeating group" is and insisting that the totality of definitions in*

the claims and specification are to be ignored" [Remarks: pg 12], the Examiner's rejection of claims 32-34 under 35 U.S.C. 112, first paragraph is based on clear and definite interpretation of the claim limitation, supported by the definitions of the words, disclosed in a well known published dictionary. Examiner respectfully suggests the Applicant to cite the portion of the specification, which **explicitly defines** the claim limitation in a way as intended and asserted by the Applicant.

Regarding the Official Notice taken in the last Office action, the Applicant argues, "*Applicant respectfully traverses the taken Official Notice at FOA page 7 that a violated dot inversion is part of the prior art and Applicant respectfully request substantiating evidence for said allegation*" [Remarks: pg 13].

Examiner respectfully rejects the Applicant's request.

M.P.E.P 2144.03 Section C discloses, "*To adequately traverse such a finding, an applicant must specifically point out the supposed errors in the examiner's action, which would include stating why the noticed fact is not considered to be common knowledge or well-known in the art*". Examiner respectfully submits that the Applicant has failed to state or explain why the use of 2-line inversion polarity scheme is not considered to be common knowledge or well-known in the art. Examiner respectfully submits that merely stating that the teaching of the Official Notice is part of prior art is not sufficient to explain why the use of 2-line inversion polarity scheme is not considered to be common knowledge. As M.P.E.P 2144.03 Section C states, Examiner respectfully submits that the common knowledge or well-known in the art statements made in the last Office action are taken to be admitted prior art, in this Office action.

The Applicant argues, "*Mori teaches an odd number of subpixels per row in this primitive repeating group. However the claims call for an even number per row.*" [Remarks: pg 13].

Examiner respectfully disagrees.

As clearly shown on figure 7 of the last Office action, each of the primitive repeating groups includes an even number of subpixels per row.

The Applicant argues, "*Martin does not have rows in his 5 subpixel primitive where each row has at least 3 different colors and where the word row is taken in a sense that is reasonable to the way the same is used in the Applicant's specification. The middle Blue of Martin's primitive is not inline and thus not in a row with the R and the G subpixels*" [Remarks: pg 13].

Examiner respectfully disagrees.

Examiner respectfully submits that having subpixels arranged in a row is taught by Mori reference. Examiner respectfully submits that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to the Applicant's argument that there is no teaching, suggestion, or motivation to combine the references, the Examiner recognizes that obviousness may be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988), *In re Jones*, 958 F.2d 347, 21

USPQ2d 1941 (Fed. Cir. 1992), and *KSR International Co. v. Teleflex, Inc.*, 550 U.S. 398, 82 USPQ2d 1385 (2007). In this case, one of ordinary skill in the art would know that modifying the panel of Mori to arrange two different colored subpixels consecutively in a row to avoid arranging two same colored subpixels consecutively in a row would improve the uniformity of the color illumination of the panel.

Remarks

It appears to be very clear as to what the Applicant and the Examiner disagree over. Accordingly, Examiner respectfully suggests the Applicant to file a pre-appeal brief which would force the Examiner to review the Examiner's rejection with two supervisory primary examiners and thus to determine whether the Examiner's current rejection is proper or not.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-5, **8-21**, **25**, **26**, and **28-35** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

As to **claim 1**, the claim discloses, ".. *first through fourth colored subpixels are* ***consecutively*** *arranged in a row*", "*said subpixel repeating group defining* ***a first column of first corresponding and same colored subpixels****, where the color of said same colored subpixels of the first column is one to which the human visual system has* ***lower luminance change sensitivity*** *than to other colors of other colored one of the subpixels*", and "*wherein the first, second, and fourth subpixels have different colors from each other*".

According to the Applicant's explanation provided on pages 11-12 of the Remarks, figure 2 of the instant invention shows R,G,B,G, in the top row and B,G,R,G, in the lower row and figure 6 shows R,B,G,B in the top row and G,B,R,B, in the lower row. Since the color blue has the lower luminance change sensitivity than red and green and the claim discloses the blue colored subpixels to be arranged in a column, figure 2 of the instant invention does not support the above claimed invention. Figure 6 shows the blue colored subpixels arranged in a column, however it does not show the blue colored subpixel is the first subpixel in the group. In a summary, the above claim limitation discloses the blue subpixels being arranged in the first column, however, the drawings and the specification of the instant Application do not support such claimed subject matter.

Appropriate correction and/or explanation is required.

For further examination purpose, the claim limitation, "*first through fourth colored subpixels are consecutively arranged in a row*" will be interpreted as, "*first through fourth colored subpixels are arranged in a row*, as best understood by the Examiner.

As to **claims 2-5**, **8-21**, **25**, **26**, and **28-31**, the claims are rejected for the similar reasons stated above.

As to **claims 32-34**, the claim discloses [lines 4-5], “the primitive subpixel repeating group being a **smallest** chooseable repeating group among possible repeating groups substantially tessellating the panel". However, the claim further discloses [lines 8-10] "said primitive repeating group including in each row thereof, a first colored subpixel, a second colored subpixel and a third colored subpixel, which have different colors from each other” and [lines 10-12] “said primitive subpixel repeating group being tessellated in a staggered manner over said panel so as to thereby define both multi-colored columns and spaced apart uni-colored columns”. Since the claim discloses that the repeating group includes spaced apart uni-colored columns and at least three different colored subpixels, the repeating group must include at least the subpixel arrangement "RBGB". However, Examiner respectfully submits that the subpixel arrangement "RBGB" is **not the smallest chooseable repeating group** among possible repeating groups substantially tessellating the panel. According to figure 6 of the instant Application, the smallest chooseable repeating group is a group of any two adjacent subpixels such as the subpixel arrangement of “RB” or "GB".

Appropriate correction/explanation is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

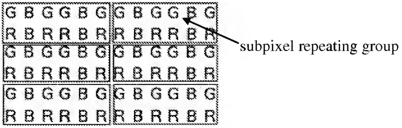
> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, **8-11**, **13-21**, **25-26**, and **28-31** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori in view of Martin.

As to **claim 1**, Mori teaches a liquid crystal display [abstract lines 1-2] comprising:

a panel [fig. 4, col. 4 lines 1-2, and drawing 1 provided below] substantially tessellated by a subpixel repeating group comprising differently colored and individually addressable subpixels and having an even number of individually addressable subpixels including a first colored subpixel [drawing 1], a second colored subpixel, a third colored subpixel, and a fourth colored subpixel, which first through fourth colored subpixels are arranged in a row, the subpixel repeating group defining a first column of first corresponding and same colored subpixels (the two blue subpixels arranged in one column of the subpixel repeating group as shown on drawing 1), where the color of the same colored subpixels (the two blue subpixels arranged in one column of the subpixel repeating group as shown on drawing 1) of the first column is one to which the human visual system has lower luminance change sensitivity than to other colors of other colored ones of the subpixels in the subpixel repeating group (The blue color is the color to which the human visual system has lower luminance change sensitivity than to red or green colors.); and

a driver circuit sending to the panel, image signals representing image data [col. 1 lines 47-52 and col. 12 lines 12-17].



Drawing 1

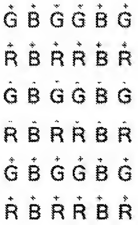
Mori does not teach that the driver circuit uses a substantially periodic dot inversion polarity scheme at one or more of the columns of first colored subpixels such that potential image degradation introduced by the periodic dot inversion polarity scheme is localized on the one or more of the columns of first colored subpixels.

However, Examiner takes Official Notice that it is well known in the art to use a periodic 2-line inversion polarity scheme as a driving method of a liquid crystal display (Note that the Applicant has claimed the polarity arrangement of "+-+-+-+--+-+-+" shown on figures 3-6 of the instant Application, which clearly violates the rule of a dot inversion polarity scheme, i.e. applying driving signals having opposite polarities to any two adjacent pixels or applying driving signals having opposite polarities to any two adjacent groups of pixels, wherein all pixels within the group are driven by the same polarity driving signals, as the "substantially periodic dot inversion". Since only a portion of the polarity arrangement of "+-+-+-+--+-+-+" satisfies the rule of the dot inversion and a portion of a periodic 2-line inversion satisfies the requirement of the dot inversion, Examiner construed a periodic 2-line inversion as the claimed substantially periodic dot inversion.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the driver circuit of Mori to use a periodic two-line inversion polarity scheme in order to reduce vertical crosstalk caused by driving a plurality of pixels/subpixels with the same polarity.

Mori as modified above teaches that the driver circuit uses a substantially periodic dot inversion polarity scheme at one or more of the columns of first colored subpixels such that potential image degradation introduced by the periodic dot inversion polarity scheme is localized

on the one or more of the columns of first colored subpixels (By having two blue subpixels having the same polarity in one column, the vertical crosstalk occurs and the image degradation of blue colors caused by the vertical crosstalk occurs.) [drawing 2 provided below, which is same as figure 15 of Mori with the two-line inversion polarity scheme].



Drawing 2

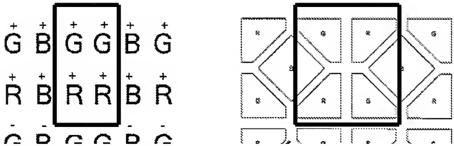
Mori does not teach that the first colored subpixel, the second colored subpixel, and the fourth colored subpixel have different colors from each other while the third colored subpixel has a same color as that of the first colored subpixels. In other words, because Mori teaches two same colored subpixels [drawing 2, "G" and "G"] are arranged consecutively in each of the rows, Mori does not teach that the first, second, and fourth colored subpixels have different colors from each other.

However, Martin [drawing 3 provided on page 9 of this Office action, which is same as figure 2 of Martin] teaches the concept of arranging two different colored subpixels (the first "G" in the first row and the first "R" in the fist row) consecutively in a row.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the panel of Mori to arrange two different colored subpixels consecutively in a row to

avoid arranging two same colored subpixels consecutively in a row, as taught by Marin, in order to provide an uniform color illumination by placing the four adjacent subpixels having two different colors in a pattern such that the two subpixels having a same color are not adjacent to each other in a horizontal direction and in a vertical direction.

Mori



Martin

Drawing 3

As to **claim 2**, Mori teaches the same color of the defined first column being a blue color (as discussed with respect to the rejection of claim 1).

As to **claim 3**, Mori as modified by Martin teaches that the subpixel repeating group substantially defines a checkerboard of red and green subpixels interspersed with two columns of blue subpixels [the drawing provided on page 3 of this Office action].

As to **claim 4**, Mori teaches that for each the subpixel repeating group, the two columns of blue subpixels share a same column data driver [fig. 25, "source driver 106"] (Note that, in the display of Mori, all subpixels share the same column driver.).

As to **claim 8**, Mori teaches a method of driving a liquid crystal display having a panel [fig. 4, col. 4 lines 1-2, and drawing 1 provided on page 6 of this Office Action] that is substantially tessellated by a primitive subpixel repeating group comprising differently colored and individually addressable subpixels disposed to define rows and columns within the primitive

subpixel repeating group where each row has an even number of individually addressable subpixels including a first colored subpixel [drawing 1], a second colored subpixel, a third colored subpixel, and a fourth colored subpixel, which first through fourth colored subpixels are arranged in a row of the primitive subpixel repeating group, the subpixel repeating group further defining as one of its columns, a first column of first corresponding and same colored subpixels (the two blue subpixels arranged in one column of the subpixel repeating group as shown on drawing 1), where the color of the same colored subpixels of the first column (the two blue subpixels arranged in one column of the subpixel repeating group as shown on drawing 1) is one to which the human visual system has lower luminance change sensitivity than to other colors of other colored ones of the subpixels in the subpixel repeating group (The blue color is the color to which the human visual system has lower luminance change sensitivity than to red or green colors.); the method comprising:

providing driver signals to the subpixels in the panel [col. 1 lines 47-52 and col. 12 lines 12-17].

Mori does not teach that the providing of the driver signals uses a substantially periodic dot inversion polarity scheme at one or more of the columns of first colored subpixels such that the potential image degradation introduced by the periodic dot inversion polarity scheme is localized on the one or more of the columns of first colored subpixels.

However, Examiner takes Official Notice that it is well known in the art to use a periodic 2-line inversion polarity scheme as a driving method of a liquid crystal display (Note that the Applicant has claimed the polarity arrangement of "+-+-+-+--+-+-+" shown on figures 3-6 of the instant Application, which clearly violates the rule of a dot inversion polarity scheme, i.e.

applying driving signals having opposite polarities to any two adjacent pixels or applying driving signals having opposite polarities to any two adjacent groups of pixels, wherein all pixels within the group are driven by the same polarity driving signals, as the “substantially periodic dot inversion”. Since only a portion of the polarity arrangement of "+-+-+-+--+-+-+" satisfies the rule of the dot inversion and a portion of a periodic 2-line inversion satisfies the requirement of the dot inversion, Examiner construed a periodic 2-line inversion as the claimed substantially periodic dot inversion.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Mori to use a periodic two-line inversion polarity scheme in order to reduce vertical crosstalk caused by having a plurality of pixels/subpixels driven by the same polarity.

Mori as modified above teaches that the providing of the driver signals uses a substantially periodic dot inversion polarity scheme at one or more of the columns of first colored subpixels such that potential image degradation introduced by the periodic dot inversion polarity scheme is localized on the one or more of the columns of first colored subpixels (By having two blue subpixels having the same polarity in one column, the vertical crosstalk occurs and the image degradation of blue colors caused by the vertical crosstalk occurs.) [drawing 2 provided on page 8 of this Office action, which is same as figure 15 of Mori with the two-line inversion polarity scheme].

Mori does not teach that the first colored subpixel, the second colored subpixel, and the fourth colored subpixel have different colors from each other while the third colored subpixel has a same color as that of the first colored subpixel. In other words, because Mori teaches two same

colored subpixels [drawing 2, “G” and “G”] are arranged consecutively in each of the rows, Mori does not teach that the first, second, and third colored subpixels have different colors from each other.

However, Martin [drawing 3 provided on page 9 of this Office action, which is same as figure 2 of Martin] teaches the concept of arranging two different colored subpixels (the first “G" in the first row and the first “R” in the fist row) consecutively in a row.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the panel of Mori to arrange two different colored subpixels consecutively in a row to avoid arranging two same colored subpixels consecutively in a row, as taught by Marin, in order to provide an uniform color illumination by placing the four adjacent subpixels having two different colors in a pattern such that the two subpixels having a same color are not adjacent to each other in a horizontal direction and in a vertical direction.

As to **claim 9**, Mori teaches the column of first colored subpixels being the column of blue subpixels [drawing 2 provided on page 8 of this Office Action].

As to **claim 10**, Mori as modified by Martin teaches that the subpixel repeating group is characterized by a checkerboard of red and green subpixels interspersed with two columns of blue subpixels [drawing 3 provided on page 9 of this Office action].

As to **claim 11**, Mori as modified by Martin teaches that for each subpixel repeating group, the providing driver signals includes providing of scheme violating signals (the signals violating the one-dot inversion polarity scheme) to the two columns of blue subpixels from a same column driver [fig. 25, “source driver 106”].

As to **claim 13**, Mori teaches a method of driving a liquid crystal display having a panel [fig. 4, col. 4 lines 1-2, and drawing 1 provided on page 6 of this Office Action] that is substantially tessellated by a primitive subpixel repeating group [drawing 1] comprising differently colored and individually addressable subpixels disposed to define rows and columns within the primitive subpixel repeating group where each row has an even number of individually addressable subpixels including a first colored subpixel [drawing 1], a second colored subpixel, a third colored subpixel, and a fourth colored subpixel, which first through fourth colored subpixels are arranged in a row of the primitive subpixel repeating group, the subpixel repeating group further defining as one of its columns, a first column of first corresponding and same colored blue subpixels (the two blue subpixels arranged in one column of the subpixel repeating group as shown on drawing 1); and the method comprising:

providing signals for image data [col. 1 lines 47-52 and col. 12 lines 12-17].

Mori does not teach the method comprising providing signals for image data having a substantially periodic dot inversion polarity scheme to the panel with use of a driver circuit outputting at least two phases such that it primarily impacts the at least one column of blue subpixels.

However, Examiner takes Official Notice that it is well known in the art to use a periodic 2-line inversion polarity scheme as a driving method of a liquid crystal display (Note that the Applicant has claimed the polarity arrangement of "+-+-+-+--+-+-+" shown on figures 3-6 of the instant Application, which clearly violates the rule of a dot inversion polarity scheme, i.e. applying driving signals having opposite polarities to any two adjacent pixels or applying driving signals having opposite polarities to any two adjacent groups of pixels, wherein all pixels within

the group are driven by the same polarity driving signals, as the "substantially periodic dot inversion". Since only a portion of the polarity arrangement of "+-+-+-+--+-+-+" satisfies the rule of the dot inversion and a portion of a periodic 2-line inversion satisfies the requirement of the dot inversion, Examiner construed a periodic 2-line inversion as the claimed substantially periodic dot inversion.).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the method of Mori to use a periodic two-line inversion polarity scheme in order to reduce vertical crosstalk caused by having a plurality of pixels/subpixels driven by the same polarity.

Mori as modified above teaches the concept of providing signals for image data having a substantially periodic dot inversion polarity scheme to the panel with use of a driver circuit outputting at least two phases such that it primarily impacts the at least one column of blue subpixels (By having two blue subpixels having the same polarity in one column, the vertical crosstalk occurs and the image degradation of blue colors caused by the vertical crosstalk occurs.) [drawing 2 provided on page 8 of this Office action, which is same as figure 15 of Mori with the two-line inversion polarity scheme].

Mori does not teach that the first colored subpixel, the second colored subpixel, and the fourth colored subpixel have different colors from each other while the third colored subpixel has a same color as that of the first colored subpixel. In other words, because Mori teaches two same colored subpixels [drawing 2, "G" and "G"] are arranged consecutively in each of the rows, Mori does not teach that the first, second, and third colored subpixels have different colors from each other.

However, Martin [drawing 3 provided on page 9 of this Office action, which is same as figure 2 of Martin] teaches the concept of arranging two different colored subpixels (the first "G" in the first row and the first "R" in the fist row) consecutively in a row.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the panel of Mori to arrange two different colored subpixels consecutively in a row to avoid arranging two same colored subpixels consecutively in a row, as taught by Marin, in order to provide an uniform color illumination by placing the four adjacent subpixels having two different colors in a pattern such that the two subpixels having a same color are not adjacent to each other in a horizontal direction and in a vertical direction.

As to **claim 14**, Mori as modified above teaches the method comprising providing a correction signal to one or more subpixels (Note that providing the image signals having the two-line inversion polarity scheme is to correct the image degradation caused by having the subpixels having the same polarity all the time).

As to **claim 15**, Mori teaches a liquid crystal display [abstract lines 1-2], comprising:

a display panel [fig. 4, col. 4 lines 1-2, and drawing 1 provided on page 6 of this Office Action] including a plurality of subpixels arranged to define a subpixel repeating group having rows and columns; each row of the subpixel repeating group having an even number of subpixels including a first colored subpixel, a second colored subpixel, a third colored subpixel, and a fourth colored subpixel, which first through fourth colored subpixels are arranged in a row of the primitive subpixel repeating group, wherein the primitive subpixel repeating group defines as one of its columns, a column of dark colored subpixels [drawing 1]; and

means [col. 1 lines 47-52 and col. 12 lines 12-17] for providing driver signals to the subpixels in the display panel to send image data.

Mori does not expressly teach the means for providing the driver signals to the subpixels in the display panel to send image data having a dot inversion polarity scheme.

However, Examiner takes Official Notice that it is well known in the art to use a dot inversion polarity scheme as a driving method of a liquid crystal display.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the means for providing the driver signals to send image data having a dot inversion polarity scheme in order to reduce vertical crosstalk caused by having a plurality of pixels/subpixels driven by the same polarity.

Mori as modified above inherently teaches that the image degradation introduced by the driver signals is localized on the column of dark colored subpixels since any image degradation caused by the dot inversion scheme would degrade the quality of the images to be displayed by all of subpixels and thus image degradation related to blue colors would be localized on the column of blue colored subpixels, which are dark colored subpixels.

Mori does not teach that the first colored subpixel, the second colored subpixel, and the fourth colored subpixel have different colors from each other while the third colored subpixel has a same color as that of the first colored subpixel. In other words, because Mori teaches two same colored subpixels [drawing 2, "G" and "G"] are arranged consecutively in each of the rows, Mori does not teach that the first, second, and third colored subpixels have different colors from each other.

However, Martin [drawing 3 provided on page 9 of this Office action, which is same as figure 2 of Martin] teaches the concept of arranging two different colored subpixels (the first "G" in the first row and the first "R" in the fist row) consecutively in a row.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the panel of Mori to arrange two different colored subpixels consecutively in a row to avoid arranging two same colored subpixels consecutively in a row, as taught by Marin, in order to provide an uniform color illumination by placing the four adjacent subpixels having two different colors in a pattern such that the two subpixels having a same color are not adjacent to each other in a horizontal direction and in a vertical direction.

As to **claim 16**, Mori teaches the column of dark colored subpixels being the column of blue subpixels [drawing 1 provided on page 6 of this Office Action].

As to **claim 17**, Mori as modified by Martin teaches that the subpixel repeating group substantially defines a checkerboard of red and green subpixels interspersed with two columns of blue subpixels [drawing 3 provided on page 9 of this Office action].

As to **claim 18**, Mori as modified by Martin teaches that the means for providing driver signals provides signals to the two columns of blue subpixels from a same column driver [fig. 25, "source driver 106"].

As to **claim 19**, Mori as modified above teaches the liquid crystal display further comprising means for providing correction signals to one or more subpixels in the group of subpixels (Note that the driver signals used to send image data having a dot inversion polarity scheme corrects the image degradation caused by a plurality of subpixels having a same polarity).

As to **claim 20**, Mori teaches a liquid crystal display [abstract lines 1-2], comprising:

display means including a plurality of subpixels arranged in accordance with a panel tessellating a subpixel repeating group [drawing 1 provided on page 6 of this Office action], the subpixel repeating group being characterized by an even number of subpixels including a first colored subpixel, a second colored subpixel, a third colored subpixel, and a fourth colored subpixel, which first through fourth colored subpixels are arranged in a row of the subpixel repeating group, and wherein the subpixel repeating group further defines at least one column of blue subpixels [drawing 1]; and

driving means [col. 1 lines 47-52 and col. 12 lines 12-17] for providing signals for image data to the display means.

Mori does not expressly teach the driving means for providing signals for image data having a dot inversion polarity scheme to the display means, wherein the driving means has at least two phases selected such that potential image degradation introduced by the dot inversion polarity scheme is placed substantially upon the at least one column of blue subpixels.

However, Examiner takes Official Notice that it is well known in the art to use a periodic 2-line dot inversion polarity scheme as a driving method of a liquid crystal display.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to modify the driving means of Mori to provide image data having a periodic two-line dot inversion polarity scheme in order to reduce vertical crosstalk caused by having a plurality of pixels/subpixels driven by the same polarity.

Mori as modified above teaches that the driving means has at least two phases selected (Note that, in the two-line dot inversion, the polarities of the driving signals are inverted every

frame) such that potential image degradation introduced by the dot inversion polarity scheme is placed substantially upon the at least one column of blue subpixels (By having two same colored subpixels having the same polarity in one column, the vertical crosstalk occurs.).

Mori does not teach that the first colored subpixel, the second colored subpixel, and the fourth colored subpixel have different colors from each other while the third colored subpixel has a same color as that of the first colored subpixel. In other words, because Mori teaches two same colored subpixels [drawing 2, “G” and “G”] are arranged consecutively in each of the rows, Mori does not teach that the first, second, and third colored subpixels have different colors from each other.

However, Martin [drawing 3 provided on page 9 of this Office action, which is same as figure 2 of Martin] teaches the concept of arranging two different colored subpixels (the first “G" in the first row and the first “R” in the fist row) consecutively in a row.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the panel of Mori to arrange two different colored subpixels consecutively in a row to avoid arranging two same colored subpixels consecutively in a row, as taught by Marin, in order to provide an uniform color illumination by placing the four adjacent subpixels having two different colors in a pattern such that the two subpixels having a same color are not adjacent to each other in a horizontal direction and in a vertical direction.

As to **claim 21**, Mori as modified above teaches the liquid crystal display comprising means for providing a correction signal to one or more subpixels (Note that providing the image signals having the two-line dot inversion polarity scheme is to correct the image degradation caused by having subpixels having the same polarity all the time.).

As to **claim 25¸** Mori as modified above teaches that the use of a driver circuit [Mori: fig. 25, "106"] comprises providing a plurality of two-phase (Note that, in the two-line inversion, the polarities of the driving signals are inverted every frame) driver chips [Mori: col. 12 lines 15-16] for driving respective bounded sections of the display; wherein phases of each provided driver chip are selected such that parasitic effects placed upon imagery of any of the subpixels driven by the phased signals are placed substantially upon subpixels disposed in columns positioned at a boundary of the bounded display sections respectively driven by the driver chips (Note that Examiner construed the two or three outmost columns of the subpixels of the display sections as the claimed boundary sections. Since the two or three outmost columns of the subpixels includes a column of the blue subpixels, the parasitic effects related to blue colors are placed substantially upon the blue subpixels disposed at a boundary of the bounded display sections.).

As to **claim 26¸** Mori as modified above teaches that the driving means [Mori: fig. 25, "106"] includes a plurality of two-phase (Note that, in the two-line inversion, the polarities of the driving signals are inverted every frame) driver chips [Mori: col. 12 lines 15-16] for providing signals for the image data having the polarity scheme to respective bounded sections of the display means; wherein the phases of each driver chip are selected such that parasitic effects placed upon imagery of any of the subpixels driven by the phased signals are placed substantially upon blue subpixels disposed in columns positioned at a boundary of the bounded display sections respectively driven by the driver chips (Note that Examiner construed the two or three outmost columns of the subpixels of the display sections as the claimed boundary sections. Since the two or three outmost columns of the subpixels includes a column of the blue subpixels, the

parasitic effects related to blue colors are placed substantially upon the blue subpixels disposed at a boundary of the bounded display sections.).

As to **claim 28**, Mori teaches that the driver circuit sends signals indicating image data having a polarity scheme to the panel such that at least two adjacent subpixels in a row have the same polarity [drawing 2 provided on page 8 of this Office action].

As to **claim 29**, Mori as modified above teaches that the means for providing driver signals includes a plurality of two-phase (Note that, in the dot inversion, the polarities of the driving signals are inverted every frame) driver chips [Mori: col. 12 lines 15-16] for sending the driver signals to the display panel; the phases of each driver chip being selected such that scheme violations (the polarity scheme violating any polarity scheme other than the dot inversion polarity scheme) introduced by the driver signals are placed substantially upon blue subpixels disposed in columns positioned at a boundary between the driver chips (Note that Examiner construed the two or three outmost columns of the subpixels of the display sections as the claimed boundary sections. Since the two or three outmost columns of the subpixels includes a column of the blue subpixels, the parasitic effects related to blue colors are placed substantially upon the blue subpixels disposed at a boundary of the bounded display sections.).

As to **claim 30**, Mori as modified above teaches that the image degradation is caused by same-color subpixels of same polarity occurring successively one after the next [drawing 2 provided on page 8 of this Office action].

As to **claim 31**, Mori as modified above teaches that the violation tends to cause image degradation due to parasitic effects of parasitic capacitance present in the panel (Note that the vertical cross-talk caused by the vertically arranged subpixels having the same polarity is caused

by parasitic or stray capacitive effects between a data line and a pixel electrode of the subpixels.) (as evidenced by US 5,841,411 col. 1 lines 42-49).

8. **Claims 5** and **12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori and Martin as applied to claims 1-4, 8-11, 13-21, 25-26, and 28-31 above, and further in view of U.S. Patent No. 5,841,411 by Francis.

As to **claim 5**, Mori as modified by Martin does not teach that a correction signal is applied to one or more of the subpixels at which the violation of the periodic dot inversion polarity scheme occurs and the applied a correction signal counters a loss of luminance caused by the violation.

However, Francis teaches the concept of applying a correction signal to one or more subpixels at which a periodic dot inversion polarity scheme does not occur to compensate a loss of the luminance caused by not having the periodic dot inversion [col. 2 lines 29-56] (Note that the vertical cross-talk can be prevented by the periodic dot inversion.).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the liquid crystal display of Mori as modified by Martin to apply a correction signal to one or more subpixels at which the periodic dot inversion polarity scheme does not occur to compensate a loss of the luminance caused by not having the periodic dot inversion, as taught by Francis, in order to reduce the luminance loss caused by the vertical cross-talk.

As to **claim 12**, Mori as modified by Martin does not teach that a correction signal is provided to one or more of the subpixels in the group of subpixels at which the violation of the periodic dot inversion polarity scheme occurs, wherein the provided correction signals counter loss of luminance caused by the violation.

However, Francis teaches the concept of providing a correction signal to one or more subpixels in a group of subpixels at which a violation of a periodic dot inversion polarity scheme occurs, wherein the provided correction signal counter loss of luminance caused by the violation [col. 2 lines 29-56] (Note that the vertical cross-talk can be prevented by the periodic dot inversion.).

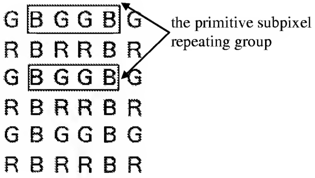
It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the liquid crystal display of Mori as modified by Martin to provide a correction signal to one or more subpixels in a group of subpixels at which a violation of a periodic dot inversion polarity scheme occurs, wherein the provided correction signal counter loss of luminance caused by the violation, as taught by Francis, in order to reduce the luminance loss caused by the vertical cross-talk.

9. **Claims 32-35** are rejected under 35 U.S.C. 103(a) as being unpatentable over Mori in view of Martin and U.S. Patent No. 7,259,755 by Ahn.

As to **claim 32**, Mori teaches a liquid crystal display [abstract lines 1-2] comprising:

a panel [drawing 4 provided below, which is same as figure 15 of Mori] organized as rows and columns of subpixels, the panel being substantially tessellated by a primitive subpixel repeating group comprising differently colored and individually addressable subpixels, the primitive subpixel repeating group being a smallest chooseable repeating group among possible repeating groups substantially tessellating the panel and the said primitive repeating group having an even number of subpixels where at least two of them are individually addressable subpixels and an even number of columns, said primitive repeating group including in each row thereof, a first colored subpixel, a second colored subpixel, and a third colored subpixel; and

a driver circuit sending to the panel, image signals representing image data [col. 1 lines 47-52 and col. 12 lines 12-17].



Drawing 4

Mori does not teach that the first colored subpixel, the second colored subpixel, and the third colored subpixel have different colors from each other, wherein the primitive subpixel repeating group is tessellated in a staggered manner over the panel so as to thereby define both multi-colored columns and spaced apart uni-colored columns, the uni-colored columns each consisting of subpixels of just one of the first through third different colors, where the color of the first colored subpixels is one to which the human visual system has lower luminance change sensitivity than to other colors of other colored ones of the subpixels in the subpixel repeating group. In other words, because Mori teaches two same colored subpixels [drawing 4 provided on page 23 of this Office action, "GG" and "RR"] are arranged consecutively in each of the rows, Mori does not teach that the first, second, and third colored subpixels have different colors from each other.

However, Martin [drawing 3 provided on page 9 of this Office action, which is same as figure 2 of Martin] teaches the concept of arranging two different colored subpixels (the first "G" in the first row and the first "R" in the fist row) consecutively in a row.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the panel of Mori to arrange two different colored subpixels consecutively in a row to avoid arranging two same colored subpixels consecutively in a row, as taught by Marin, in order to provide an uniform color illumination by placing the four adjacent subpixels having two different colors in a pattern such that the two subpixels having a same color are not adjacent to each other in a horizontal direction and in a vertical direction.

Mori as modified by Martin [drawing 5 provided on page 25 of this Office action] teaches that the first colored subpixel [drawing 5, the first blue subpixel in the box], the second colored subpixel [drawing 5, the red subpixel in the box], and the third colored subpixel [drawing 5, the green subpixel in the box] have different colors from each other, wherein the primitive subpixel repeating group is tessellated in a staggered manner over the panel so as to thereby define both multi-colored columns [drawing 5, the two adjacent "R" and "G" arranged in the first and second rows, and third column] and spaced apart uni-colored columns [drawing 5, the two adjacent "B"s arranged in the first and second rows, and second column], the uni-colored columns each consisting of subpixels of just one of the first through third different colors, where the color of the first colored subpixels is one to which the human visual system has lower luminance change sensitivity than to other colors of other colored ones of the subpixels in the subpixel repeating group.

G	B	R	G	B	R
R	B	G	R	B	G
G	B	R	G	B	R
R	B	G	R	B	G
G	B	R	G	B	R
R	B	G	R	B	G

Drawing 5

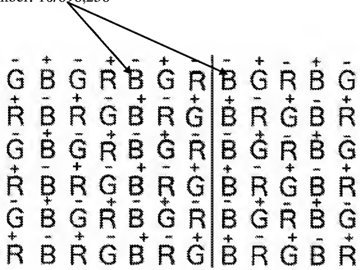
Mori as modified by Martin does not teach that the driver circuit uses a multi-row inversion polarity scheme that uses a same polarity start of inversion within groups of adjacent rows but nonetheless provides dot inversion in the columnar direction as between adjacent rows or as between one group of the adjacent rows and the next group and which further provides subpixel-to-subpixel dot inversion in the row direction substantially across each row but sporadically violates the in-row dot inversion polarity scheme in localized areas of the panel, where the localized areas of violation each includes one of the first colored subpixels such that potential image degradation introduced by the sporadic violation of the in-row dot inversion polarity scheme is localized to be lessened by the lower sensitivity to change of luminance of the first colored subpixels.

However, Ahn teaches that a driver circuit of a liquid crystal display uses a multi-row inversion polarity scheme that uses a same polarity start of inversion within groups of adjacent rows [fig. 5a, Note that Examiner construed each group of adjacent rows corresponding to each gate driver as a group. Thus, the first group has a polarity start of "+" in the first row and "-" in the second row and the second group has a polarity start of “+” in the first row and “-“ in the

second row.] but nonetheless provides dot inversion in the columnar direction as between adjacent rows or as between one group of the adjacent rows and the next group and which further provides subpixel-to-subpixel dot inversion in the row direction substantially across each row but sporadically violates the in-row dot inversion polarity scheme. [fig. 5a, Note that the black area has two same polarities adjacent to each other.].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the driver circuit of Mori as modified by Martin to use Ahn's above disclosed polarity driving scheme, in order to reduce the image degradation of the liquid crystal display of Mori.

Mori as modified by Martin and Ahn [drawing 6 provided on page 27 of this Office action, which is same as figure 15 of Mori as modified by the subpixel arrangement of Martin and the polarity driving scheme of Ahn] teaches that the violation of the in-row dot inversion polarity scheme occurs in localized areas of the panel [drawing 6, the two pixels adjacent to the border line in each of the rows], where the localized areas of violation each includes one of the first colored subpixels such that potential image degradation introduced by the sporadic violation of the in-row dot inversion polarity scheme is localized to be lessened by the lower sensitivity to change of luminance of the first colored subpixels (As shown on drawing 6 provided below, which is same (Note that since the blue subpixels adjacent to the border line have a negative polarity by violating the in-row dot inversion, the two closed blue subpixels in each row have the same polarity. Thus, the blue image degradation occurs.).



Drawing 6

As to **claim 33**, Mori teaches a method used with a liquid crystal display [abstract lines 1-2] having a panel organized as rows and columns of subpixels, wherein the panel [drawing 4 provided on page 23 of this Office action, which is same as figure 15 of Mori] is substantially tessellated by a primitive subpixel repeating group, which primitive subpixel repeating group is smallest chooseable repeating group among possible repeating groups substantially tessellating the panel, and which primitive subpixel repeating group has an even number total of different colored subpixels among which at least differently colored ones are individually addressable, the differently colored subpixels within a row of the primitive subpixel repeating group including a first colored subpixel, a second colored subpixel, and a third colored subpixel,

the method comprising:

providing driver signals to the subpixels in the panel data [col. 1 lines 47-52 and col. 12 lines 12-17].

Mori does not teach that the first colored subpixel, the second colored subpixel, and the third colored subpixel have different colors from each other, wherein the primitive subpixel repeating group is tessellated in a staggered manner over the panel so as to thereby define both

multi-colored columns and spaced apart uni-colored columns, the uni-colored columns each consisting of subpixels of just the first colored subpixels, where the color of the first colored subpixels is one to which the human visual system has lower luminance change sensitivity than to other colors of other colored ones of the subpixels in the primitive subpixel repeating group. In other words, because Mori teaches two same colored subpixels [drawing 4 provided on page 23 of this Office action, "GG" and "RR"] are arranged consecutively in each of the rows, Mori does not teach that the first, second, and third colored subpixels have different colors from each other.

However, Martin [drawing 3 provided on page 9 of this Office action, which is same as figure 2 of Martin] teaches the concept of arranging two different colored subpixels (the first "G" in the first row and the first "R" in the fist row) consecutively in a row.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the panel of Mori to arrange two different colored subpixels consecutively in a row to avoid arranging two same colored subpixels consecutively in a row, as taught by Marin, in order to provide an uniform color illumination by placing the four adjacent subpixels having two different colors in a pattern such that the two subpixels having a same color are not adjacent to each other in a horizontal direction and in a vertical direction.

Mori as modified by Martin [drawing 5 provided on page 25 of this Office action] teaches that the first colored subpixel [drawing 5, the first blue subpixel in the box], the second colored subpixel [drawing 5, the red subpixel in the box], and the third colored subpixel [drawing 5, the green subpixel in the box] have different colors from each other, wherein the primitive subpixel repeating group is tessellated in a staggered manner over the panel so as to

thereby define both multi-colored columns [drawing 5, the two adjacent "R" and "G" arranged in the first and second rows, and third column] and spaced apart uni-colored columns [drawing 5, the two adjacent "B"s arranged in the first and second rows, and second column], the uni-colored columns each consisting of subpixels of just the first colored subpixels, where the color of the first colored subpixels is one to which the human visual system has lower luminance change sensitivity than to other colors of other colored ones of the subpixels in the subpixel repeating group.

Mori as modified by Martin does not teach that the method provides a substantially periodic dot inversion polarity scheme wherein a same polarity start of inversion occurs within groups of adjacent rows but nonetheless provides dot inversion in the columnar direction as between adjacent rows or as between one group of the adjacent rows and the next group and which substantially periodic dot inversion polarity scheme further provides subpixel-to-subpixel dot inversion in the row direction substantially across each row and provides driver signals to the subpixels in the panel, wherein the providing of the driver signals causes sporadic violation subpixel-to-subpixel dot inversion in the row direction, but where the sporadic violations are localized at one or more of the columns of first colored subpixels such that potential image degradation introduced by the sporadic violation subpixel-to-subpixel dot inversion in the row direction is lessened due to the lower sensitivity to change of luminance of the visual system for the column of first colored subpixels.

However, Ahn teaches a method of driving a liquid crystal display [abstract], which provides a substantially periodic dot inversion polarity scheme [fig. 5a] wherein a same polarity start of inversion occurs within groups of adjacent rows but nonetheless provides dot inversion in

the columnar direction as between adjacent rows or as between one group of the adjacent rows and the next group [fig. 5a, Note that Examiner construed each group of adjacent rows corresponding to each gate driver as a group. Thus, the first group has a polarity start of "+" in the first row and "-" in the second row and the second group has a polarity start of "+" in the first row and "-" in the second row.] and which substantially periodic dot inversion polarity scheme further provides subpixel-to-subpixel dot inversion in the row direction substantially across each row and provides driver signals to the subpixels in the panel, wherein the providing of the driver signals causes sporadic violation subpixel-to-subpixel dot inversion in the row direction [fig. 5a, Note that the black area has two same polarities adjacent to each other.].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the driver circuit of Mori as modified by Martin to use Ahn's above disclosed polarity driving scheme, in order to reduce the image degradation of the liquid crystal display of Mori.

Mori as modified by Martin and Ahn [drawing 6 provided on page 27 of this Office action, which is same as figure 15 of Mori as modified by the subpixel arrangement of Martin and the polarity driving scheme of Ahn] teaches that the sporadic violations are localized at one or more of the columns of first colored subpixels such that potential image degradation introduced by the sporadic violation subpixel-to-subpixel dot inversion in the row direction is lessened due to the lower sensitivity to change of luminance of the visual system for the column of first colored subpixels (As shown on drawing 6 provided on page 27 of this Office action, which is same (Note that since the blue subpixels adjacent to the border line have a negative polarity by violating the in-row dot inversion, the two closed blue subpixels in each row have the same polarity. Thus, the blue image degradation occurs.).

As to **claim 34**, Mori teaches a method of providing image data in a liquid crystal display [abstract lines 1-2] having a panel [drawing 4 provided on page 23 of this Office action, which is same as figure 15 of Mori] that is substantially tessellated by a primitive subpixel repeating group, which primitive subpixel repeating group is smallest chooseable repeating group among possible repeating groups substantially tessellating the panel, and which primitive subpixel repeating group has an even number total of different colored subpixels wherein a row of the primitive subpixel repeating group contains a first colored subpixel, a second colored subpixel, and a third colored subpixel;

the method comprising:

providing signals for image data [col. 1 lines 47-52 and col. 12 lines 12-17].

Mori does not teach that the first colored subpixel, the second colored subpixel, and the third colored subpixel have different colors from each other, wherein the primitive subpixel repeating group is tessellated so as to form at least one column of just blue subpixels on the panel. In other words, because Mori teaches two same colored subpixels [drawing 4 provided on page 23 of this Office action, "GG" and "RR"] are arranged consecutively in each of the rows, Mori does not teach that the first, second, and third colored subpixels have different colors from each other.

However, Martin [drawing 3 provided on page 9 of this Office action, which is same as figure 2 of Martin] teaches the concept of arranging two different colored subpixels (the first "G" in the first row and the first "R" in the fist row) consecutively in a row.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the panel of Mori to arrange two different colored subpixels consecutively in a row to

avoid arranging two same colored subpixels consecutively in a row, as taught by Marin, in order to provide an uniform color illumination by placing the four adjacent subpixels having two different colors in a pattern such that the two subpixels having a same color are not adjacent to each other in a horizontal direction and in a vertical direction.

Mori as modified by Martin [drawing 5 provided on page 25 of this Office action] teaches that the primitive subpixel repeating group is tessellated so as to form at least one column of just blue subpixels on the panel.

Mori as modified by Martin does not teach that the method provides a substantially periodic dot inversion polarity scheme to the panel which creates a sporadically violated subpixel-to-subpixel dot inversion in the row direction, but where the sporadic violations are localized to the vicinity of the at least one column of just blue subpixels.

However, Ahn teaches a method of driving a liquid crystal display [abstract], which provides a substantially periodic dot inversion polarity scheme [fig. 5a] to a panel which creates a sporadically violated subpixel-to-subpixel dot inversion in a row direction, but where the sporadic violations are localized to the vicinity of the at least one column of subpixels [fig. 5a, Note that the black area has two same polarities adjacent to each other.].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the driver circuit of Mori as modified by Martin to use Ahn's above disclosed polarity driving scheme, in order to reduce the image degradation of the liquid crystal display of Mori.

Mori as modified by Martin and Ahn [drawing 6 provided on page 27 of this Office action, which is same as figure 15 of Mori as modified by the subpixel arrangement of Martin and the polarity driving scheme of Ahn] teaches that the sporadic violations are localized to the

vicinity of the at least one column of just blue subpixels (As shown on drawing 6 provided on page 27 of this Office action, which is same (Note that since the blue subpixels adjacent to the border line have a negative polarity by violating the in-row dot inversion, the two closed blue subpixels in each row have the same polarity. Thus, the blue image degradation occurs.).

As to **claim 35**, Mori teaches a liquid crystal display [abstract lines 1-2], comprising:

a display panel [drawing 4 provided on page 23 of this Office action, which is same as figure 15 of Mori] including a plurality of subpixels arranged as a staggered tessellation by a primitive subpixel repeating group; the primitive subpixel repeating group comprising an even number subpixels in a row direction thereof, including a first colored subpixel, a second colored subpixel, and a third colored subpixel; and

means for providing driver signals to the subpixels in the display panel to send image data [col. 1 lines 47-52 and col. 12 lines 12-17].

Mori does not teach that the first colored subpixel, the second colored subpixel, and the third colored subpixel have different colors from each other, wherein a column of only dark colored subpixels is included. In other words, because Mori teaches two same colored subpixels [drawing 4 provided on page 23 of this Office action, "GG" and "RR"] are arranged consecutively in each of the rows, Mori does not teach that the first, second, and third colored subpixels have different colors from each other.

However, Martin [drawing 3 provided on page 9 of this Office action, which is same as figure 2 of Martin] teaches the concept of arranging two different colored subpixels (the first "G" in the first row and the first "R" in the fist row) consecutively in a row.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the panel of Mori to arrange two different colored subpixels consecutively in a row to avoid arranging two same colored subpixels consecutively in a row such that a column of only dark colored subpixels is included, as taught by Marin, in order to provide an uniform color illumination by placing the four adjacent subpixels having two different colors in a pattern such that the two subpixels having a same color are not adjacent to each other in a horizontal direction and in a vertical direction.

Mori as modified by Martin does not teach that the image data has a dot inversion polarity scheme to the panel which creates a sporadically violated subpixel-to-subpixel dot inversion in a row direction, but where the sporadic violations are localized to the vicinity of the dark colored subpixels.

However, Ahn teaches a means for providing driver signals to subpixels in a display panel of a liquid crystal display [abstract], which send image data having a dot inversion polarity scheme [fig. 5a] creates a sporadically violated subpixel-to-subpixel dot inversion in a row direction, but where the sporadic violations are localized to the vicinity of subpixels [fig. 5a, Note that the black area has two same polarities adjacent to each other.].

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the driver circuit of Mori as modified by Martin to use Ahn's above disclosed polarity driving scheme, in order to reduce the image degradation of the liquid crystal display of Mori.

Mori as modified by Martin and Ahn [drawing 6 provided on page 27 of this Office action, which is same as figure 15 of Mori as modified by the subpixel arrangement of Martin and the polarity driving scheme of Ahn] teaches that the sporadic violations are localized to the

vicinity of the dark colored subpixels (As shown on drawing 6 provided below, which is same (Note that since the blue subpixels adjacent to the border line have a negative polarity by violating the in-row dot inversion, the two closed blue subpixels in each row have the same polarity. Thus, the blue image degradation occurs.).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to SEOKYUN MOON whose telephone number is (571)272-5552. The examiner can normally be reached on 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sumati Lefkowitz can be reached on 572-272-3638. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Seokyun Moon/
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